Dairy Australia

Dairy Farm Monitor Project

South Australia Annual Report 2023/24

Delivering for Dairy

Acknowledgements

Participants

To continuing and returning participants and those new to the project, thank you for your participation, including all your efforts in supplying data for the 2024 Dairy Farm Monitor Project.

Project participants were selected based on a distribution of farm size, feeding system, herd size and geographical location within each region and results should not be viewed as a representation of the entire South Australian dairy farm population.

Report

The report was prepared by Fiona Smith (F. Smith Agribusiness Consulting) in conjunction with Dairy Australia.

Contributors/data collectors

Greg Mitchell (FPAG), Chris Scheid (Moore Australia) and Fiona Smith (F. Smith Agribusiness Consulting).

These people collected farm data and provided feedback and validation to ensure the accuracy and integrity of the information.

The diligent work of Dairy Australia's consultant analysts Fiona Smith and Kerry Kempton, who conducted data checking, validation and analysis is much appreciated.

Appendix tables

The appendices at the end of this report provide detailed metrics on the historical physical and financial performance and efficiency for the average of the South Australian project participants.

Further information

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What's new in 2023/24

The Dairy Farm Monitor Report for 2023/24 includes some minor changes and updates from last year.

- The number of farms in the project reduced by one to fourteen.
- "Homegrown feed as % of ME consumed" is now aligned with the DairyBase calculation and is homegrown feed consumed (including wastage) + grazed feed. Historically the calculation was homegrown feed fed (no wastage included) + grazed feed.
- Changes to ADCC estimates
  - Changes in emission factors, e.g. electricity-derived emissions have come down for most states, although diesel-derived emissions have increased. Similarly, some CH4 and N2O emission from fertiliser and waste management have decreased, while others have increased based on the most recent scientific results.
  - More accurate allocation of purchased feed-derived emissions to milk vs meat enterprise, based on where the purchased feed is fed on the farm. Any feed fed on the milking platform is allocated to the milk enterprise. Any feed fed on the support block is proportionally allocated to both enterprises based on the ratio of milk to meat produced. This change may increase meat emissions intensity for some farms.
  - Tree sequestration was missing for some regions when selected Radiata pine (i.e. Tasmania, Queensland, Mallee region, and the South Coast and Riverina/Inland region of NSW).
  - In 2022/23 greater detail was collected about manure management at the dairy and feeding areas, fuel usage by contractors and trees, meaning historical data may not be comparable.

Executive summary

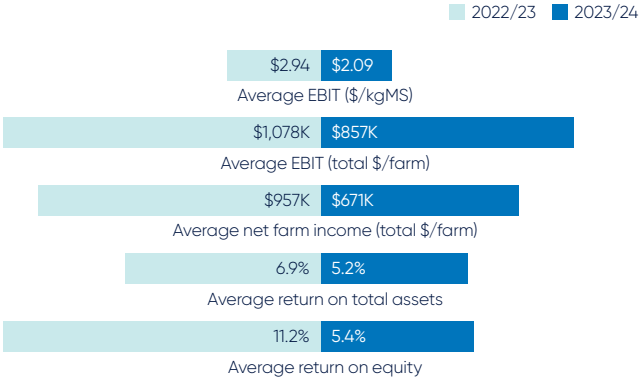
In 2023/24 the average South Australia Farm Monitor total profitability decreased on the previous year whilst being the second highest in the 12-years of the project (accounting for inflation).

The average dairy farm monitor participant recorded $856,982 ($2.09 per kilogram of milksolids ($/kgMS)) in profit on the back of the second highest milk price in the history of the project at $9.86.

Average milk price decreased to $9.86/kgMS, which combined with a $0.41/kgMS drop in livestock trading profits and $0.43/kgMS increase in variable costs contributed to a 29 per cent decline in profit for the year.

Challenging seasonal conditions influenced the physical and financial performance across the state.

South Australia



Challenging weather conditions across much of South Australia was one of the key factors affecting profits in 2023/24. Whilst milk price remained comparatively strong at $9.86/kgMS, a decline in livestock trading conditions contributed to a decrease in gross farm income. When combined with an increase in variable costs, largely due to higher purchased feed costs, this resulted in a 29 per cent decrease in overall profitability to $2.09/kgMS. Financing costs continued to rise on the back of higher interest rates and increased debt levels across participant farms.

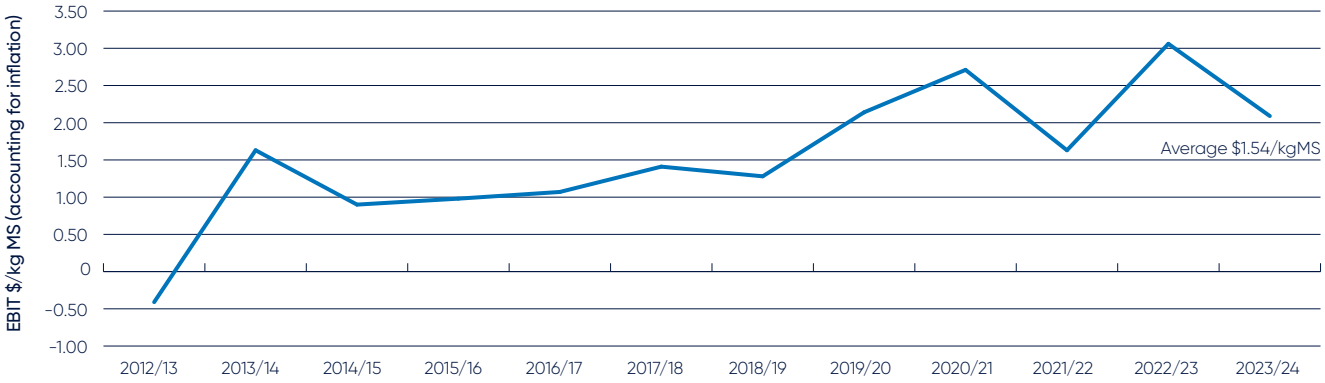
Annual rainfall was well down on long-term averages with the dry spring leading to reduced tonnages of homegrown conserved fodder. December rain across much of the state assisted with out-of-season grazing across the summer months, however the extremely late break to the season in 2024 resulted in a drop in grazed feed and an increased requirement for purchased feed across the year.

Whilst gross farm income was the second highest over the 12 years (accounting for inflation), profitability (average EBIT per kilogram of milk solids) dropped to the fourth highest on record.

Variable costs increased again on last year to be the highest seen so far in the project (accounting for inflation), whilst overhead costs decreased on the previous year to the sixth lowest demonstrating that participant farms are still focused on core cost control in their businesses.

How does 2023/24 compare?

Historical profitability



Average profit (per kg milk solids) in 2023/24 was above the long-term average for South Australia.

Strong profit results per farm (average $856,982) across the state, were well above the 12-year long term average of $469,773, although lower than the average of $1,122,131 (adjusted for inflation) in 2022/23.

Milk price

Milk price declined marginally in 2023/24 with milk income contributing on average, 93 per cent of gross farm income. This was an increase on last year caused by the declining contribution of livestock trading profits to gross farm income due to declining trading conditions compared to last year.

South Australia → 0%
to $9.86/kgMS

Expectations for profit in 2024/25

The majority (57%) of participant farms were expecting farm business returns to decline in the coming 12 months with 29 per cent of participants expecting similar returns in 2023/24. Climate and seasonal conditions were identified by participants as the greatest risk to their business for the coming 12 months with milk price remaining the most important factor over the next five years.

Greenhouse gas emissions

The average net greenhouse gas emissions for South Australian dairy farm monitor participants were 5,046 tonnes of carbon dioxide equivalents per farm in 2023/24. This was an increase on the previous year, likely due to an increase across all the emissions sources associated with higher average milk solids production. Emissions intensity increased again to 0.91 t CO2-e/t FPCM.

State overview

State-wide, average profitability in South Australia decreased by 29 per cent to $2.09/kgMS.

The 37 per cent decrease in livestock trading profits and nine per cent increase in variable costs were the main driver of the decline in Earnings before interest and tax (EBIT).

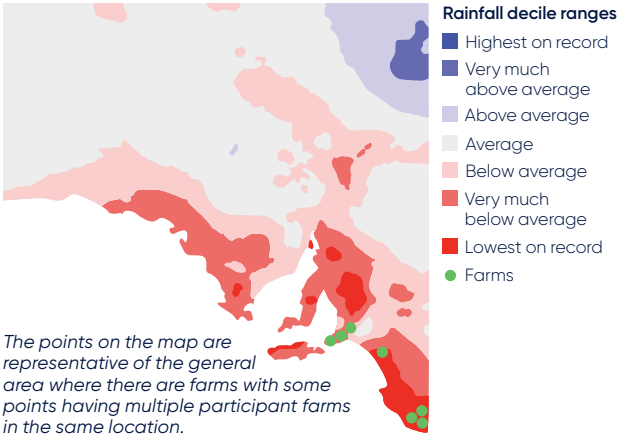
Profitability was hampered by challenging seasonal conditions particularly across spring and autumn, resulting in a decrease in overall homegrown feed on milking area and a decrease in the proportion of homegrown feed in the diet by six per cent.

Homegrown feed costs decreased compared to 2022/23 on the back of poorer growing conditions, whilst purchased feed costs increased 17 per cent. Participant farms also drew down fodder reserves, with an additional $0.16/kgMS feed inventory utilised to support milk production for the year. Total overhead costs decreased by two per cent compared to 2022/23 with the biggest decrease coming from lower employed labour costs which was only marginally offset by increased imputed labour costs as businesses on average reduced their paid labour units.

Dairying in South Australia

There were approximately **170** dairy farm businesses in SA that produced **479 million litres** or **5.7 per cent** of Australia's national milk production in 2023/24.

Dairy Farm Monitor Project farm locations and rainfall in 2023/24



The points on the map are representative of the general area where there are farms with some points having multiple participant farms in the same location.

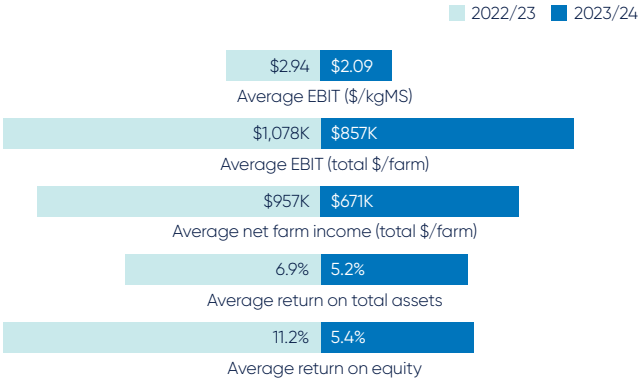
Physical farm characteristics

The average herd size in South Australia once again increased to 648 cows, with milk produced per cow also increasing from 553kgMS/cow to 575kgMS/cow. Farms grazed and conserved less feed on their milking areas this year on the back of below average rainfall, with some farms receiving the lowest rainfall on record.

Average herd size	Milk solids sold	Homegrown feed
↑6%	↑4%	↓10%
648 cows	575kgMS/cow	55% of metabolisable energy consumed

Profitability

In 2023/24, 93 per cent of SA participants recorded a positive profit



In 2023/24 farm profitability for the state has been influenced by:

→ Stable
average milk price at **$9.86/kgMS**

↓ 7%
in herd costs to **$0.40/kgMS**

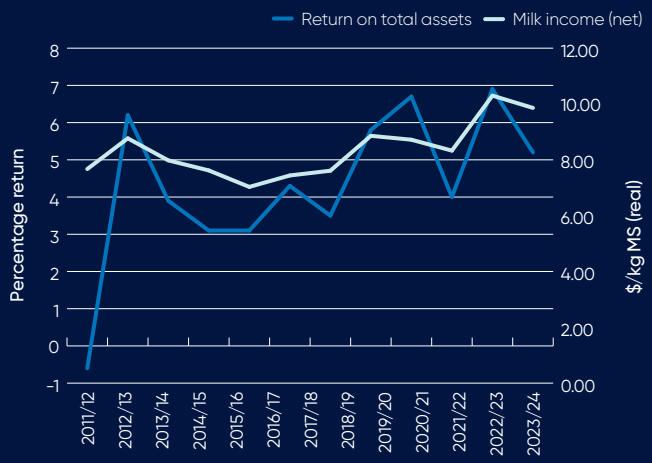
↑ 7%
in shed costs to **$0.32/kgMS**

↑ 11%
in total feed costs to **$4.59/kgMS**

↓ 2%
in overhead costs to **$3.18/kgMS**

Despite stable milk prices the increase in purchased feed costs, due to below average rainfall, resulted in a decrease in average farm profit on a dollars per kilogram milksolids basis to the fourth highest on record, accounting for inflation.

Return on total assets and milk price



Physical parameters and seasonal conditions

Seasonal conditions were challenging across the state with all participant farms receiving below average rainfall in 2023/24, which significantly impacted the spring of 2023 and autumn of 2024.

Seasonal conditions throughout the year resulted in a decrease in homegrown feed on milking platforms, with an increase in purchased feed to fill the gap.

Farm systems have remained similar, although the average herd size increased again in 2023/24 to the highest in the projects twelve-year history.

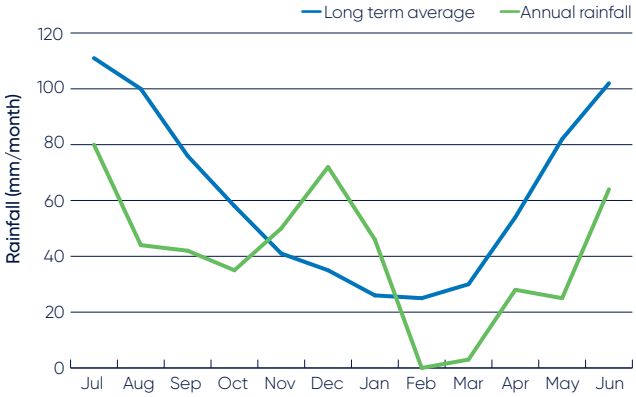
SA pasture based dairy production

Dairying in South Australia is predominantly pasture based, with 55 per cent of all consumed metabolisable energy home grown across participant farms. Spring and autumn rainfall are important as is the availability of adequate water across irrigation areas.

Rainfall

Below average spring rainfall in 2023 was followed by above average early summer rainfall before declining to below average from February for the remainder of the year which impacted both the physical and financial performance across South Australia. The preceding conditions as well as the conditions prevalent in a particular month influence feed availability and conditions to harvest pastures and crops as well as their timely renovation or sowing.

Figure 1 Monthly rainfall 2023/24

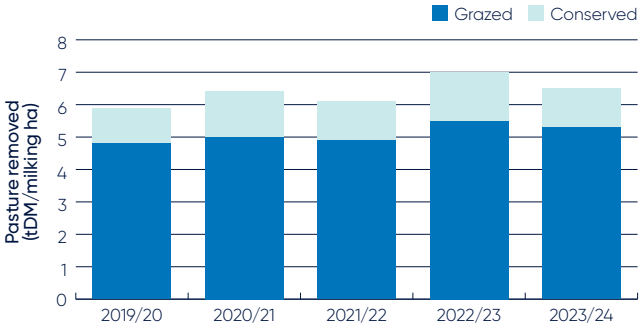


Below average rainfall throughout spring (Figure 1) resulted in reduced tonnages of homegrown conserved fodder. Above average rainfall on a number of farms across early summer resulted in significant quantities of out-of-season grazing even from dryland perennial pastures. However, below average rainfall from February through to the end of the financial year resulted in lower levels of grazed feed and an increased reliance on purchased fodder and concentrates to sustain milk production on farm.

Feed consumption and harvest

With lower homegrown feed availability across the state, the average tonnes of homegrown feed decreased by 0.5 t DM/ha (Figure 2). The proportion of concentrates consumed in the diet increased marginally whilst there was an increase in fodder as a proportion of the diet, on the back of decreased availability of grazed feed.

Figure 2 Estimated tonnes of homegrown feed removed

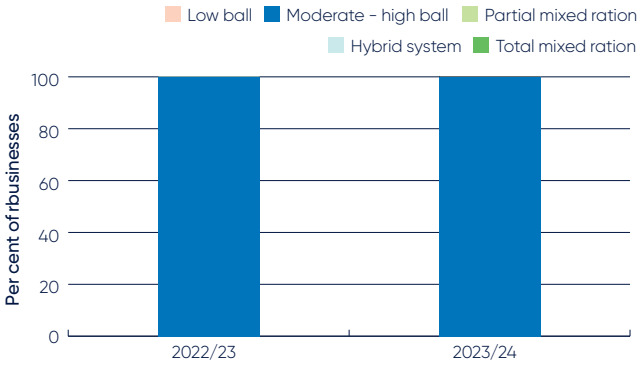


Feeding system

Moderate to high bail feeding systems were the only feeding systems utilised by participant farms again in 2023/24 (Figure 3). This is based on consistency across participant farms this year, rather than necessarily showing a particular trend in the South Australian farming systems.

South Australia is predominantly reliant on perennial pasture species, comprising approximately 72 per cent of pastures on average, with the remaining portion made up of annuals.

Figure 3 Type of feeding systems



Information on feeding systems was first collected in 2020/21 to capture the transition of dairy feeding systems in South Australia over time, reflecting a longer-term decision made by the business operator to manage a certain type of feeding system, rather than a short term one to manage adverse seasonal conditions in a given year.

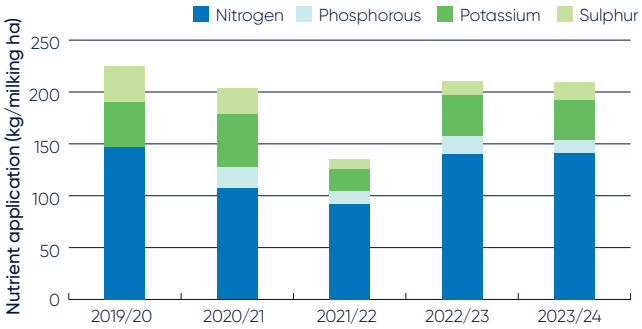
Fertiliser application

Total nutrient application on the milking area remained the same as 2022/23 although there was shift to more sulphur in the mix compared to phosphorous. Stable fertiliser prices resulted in farmers applying similar quantities of fertiliser this year, despite seasonal conditions not being as favourable.

In comparison to the previous year, Figure 4 shows that in 2023/24:

- Nitrogen applied was 141kg/ha, similar to last year.
- Phosphorous applied was 12kg/ha, a 29 per cent decrease.
- Potassium applied was 39kg/ha, similar to last year.
- Sulphur applied was 17kg/ha, a 31 per cent increase.

Figure 4 Nutrient application

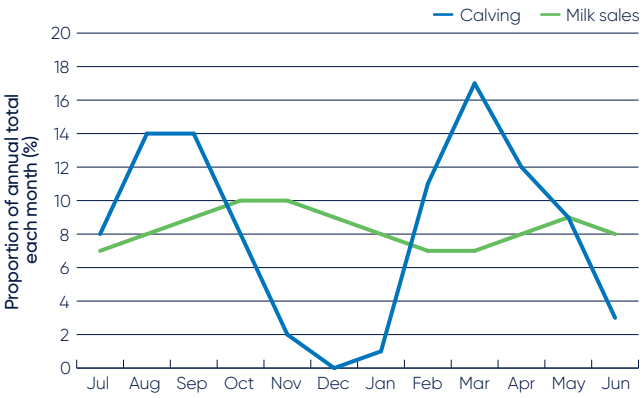


Milk solids sold

South Australian participant farms, on average, increased the level of total milk production on farm due to an increase in average herd size paired with an increase in milk production per cow.

Milk production reflects the seasonal nature of calving. Calving pattern determines milk production and subsequently the milk payment system available to participant farms (Figure 5).

Figure 5 Monthly distribution of milk sales and calving



Calving pattern

South Australia is characterised by split calving (spring and autumn) as shown in Figure 5. The calving pattern determines the feed requirements on farm with some farms electing to calve year-round. The lowest proportion of cows calving occurs across the hotter summer months.

Whole farm analysis

Earnings Before Interest and Tax (EBIT) was positive on 93 per cent of participating farms.

Milk price decreased marginally to $9.86/kgMS while livestock trading profit decreased by 37 per cent to $0.69/kgMS.

Variable costs increased by nine per cent, primarily due to purchased feed costs, with overhead costs decreasing by two per cent, largely on the back of decreased reliance on paid labour.

Increased interest and lease costs, driven by larger borrowings and rising interest rates, put additional pressure on farm finances.

Gross farm income

Gross farm income decreased by four per cent to $10.59/kgMS, the second highest for South Australia in the twelve-year history of DFMP (accounting for inflation). Decreasing livestock trading profits was the main reason it declined on last year's record high.

Variable costs

Variable costs increased by $0.43/kgMS with higher purchased feed costs being the largest component.

Homegrown feed costs decreased by $0.34/kgMS with fertiliser contributing $0.14/kgMS, hay and silage $0.12/kgMS, and pasture and crop costs a further $0.06/kgMS to the decrease. Irrigation costs were the only homegrown feed costs to increase over the year on the back of increased reliance on irrigation due to below average rainfall.

Purchased feed costs increased, on the back of higher proportions of concentrates and fodder in the diet and increased fodder prices due to poor seasonal conditions across South Australia and other parts of Australia.

The below average rainfall across spring and autumn also resulted in the majority of farms drawing down feed inventories across the year.

Whilst shed costs increased, herd costs decreased on the back of decreases in both animal health and AI and herd test costs.

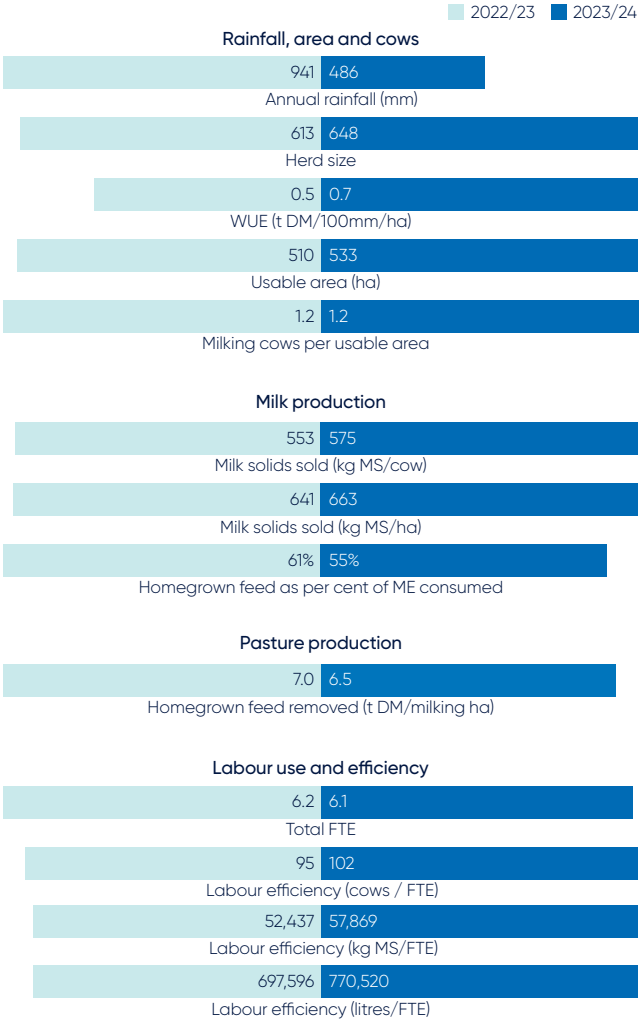
Overhead costs

Total overhead costs decreased on average by two per cent in 2023/24 despite an increase in spending in most of the overhead cost categories. The decrease was due to a decrease in employed labour costs from $1.30/kgMS to $1.10/kgMS on the back of a drop in paid labour units from an average of 4.5 to 4.2 full time equivalents.

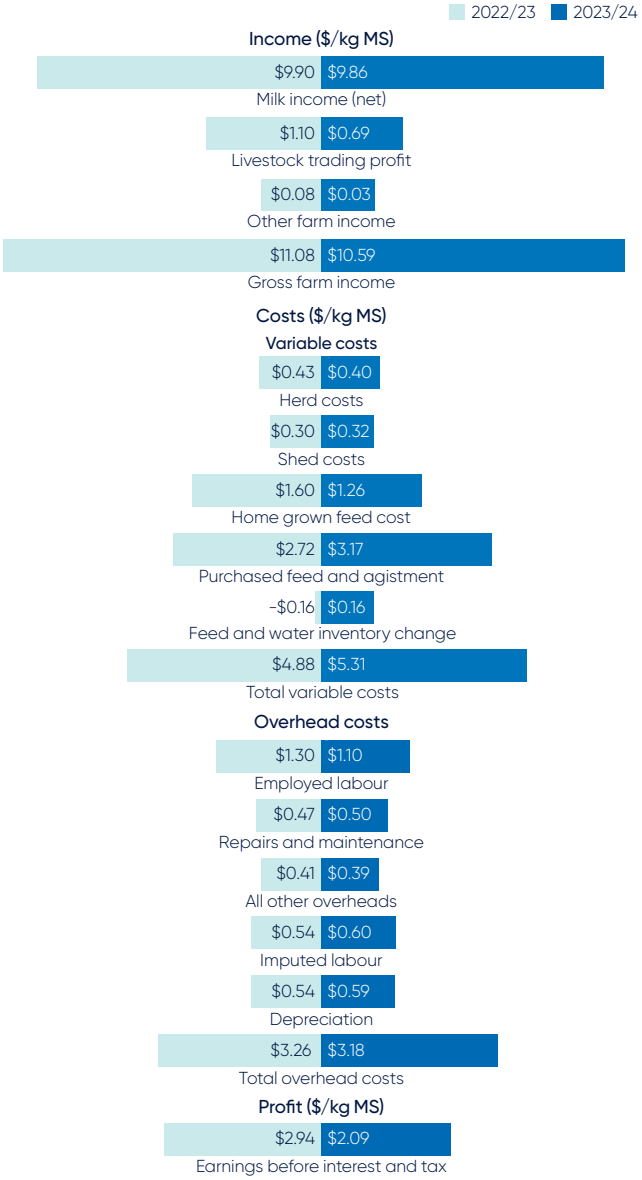
The decrease in paid labour was offset marginally by a $0.06/kgMS increase in imputed labour.

Repairs and maintenance and depreciation both increased with farms still playing catch up on repairs and increased depreciation due to capital improvements on farm or additional plant and equipment purchases.

Physical parameters



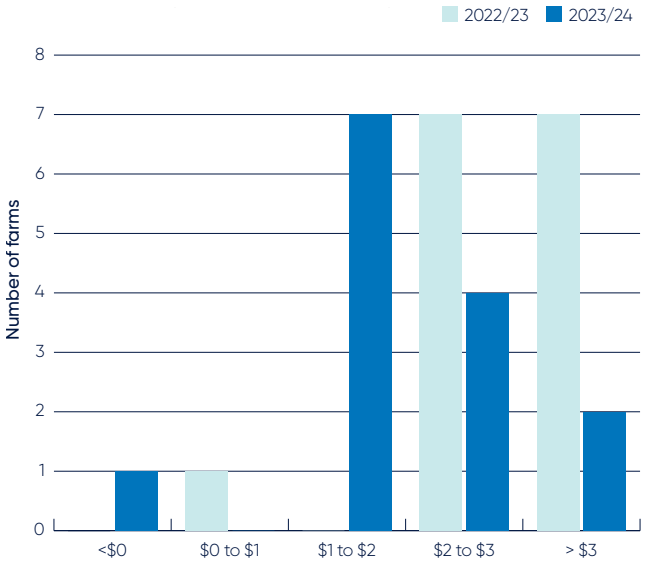
Financial parameters



Earnings before interest and tax

In 2023/24, 93 per cent of participants had a positive EBIT (Figure 6). Average EBIT per farm (total dollars) was the second highest in the 12 years of the DFMP, accounting for inflation. Average EBIT ($/kgMS) was lower year-on-year and the fourth highest on record, accounting for inflation.

Figure 6 Average EBIT per kgMS



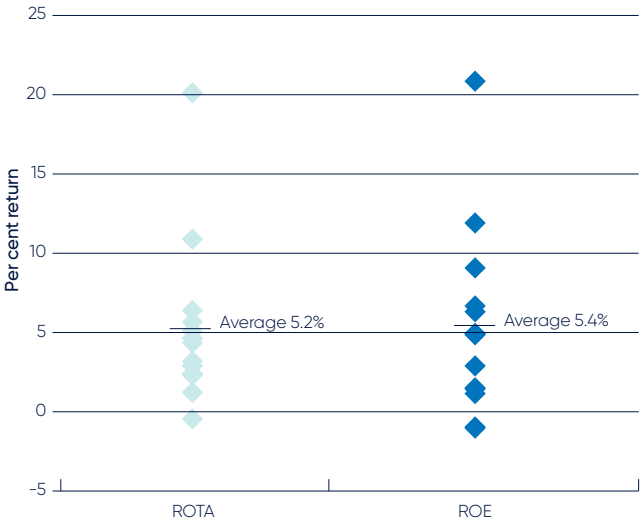
Return on total assets and equity

A positive return on total assets (ROTA) was recorded for 93 per cent of participants (Figure 7). In 2023/24 average ROTA decreased to 5.2 per cent compared to 6.9 per cent the previous year. The lower returns were predominantly a result of lower total EBIT across participant farms.

Average return on equity (ROE) in 2023/24 decreased to 5.4 per cent relative to the previous year at 11.2 per cent whilst remaining above the long-term average of 4.6 per cent.

Equity levels on average remained stable at 83% with the majority of farms having an increase in individual equity levels during the last 12 months.

Figure 7 Average returns – ROTA and ROE



Business confidence

Participant farmers predominantly expected declining business returns in the coming 12 months (2024/25).

The majority of participant farms expected milk price to remain stable with a mixed outlook on milk production, with only 29 per cent expecting an increase.

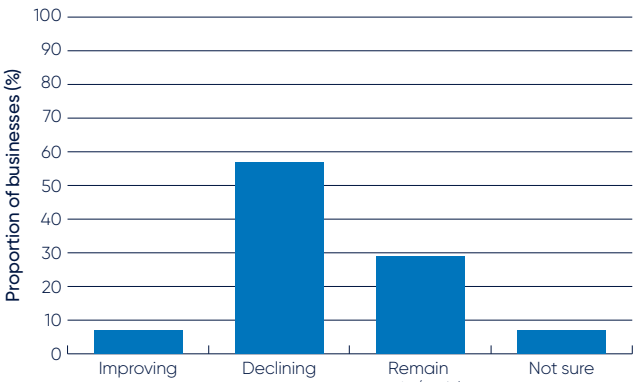
Climate and seasonal conditions was the major issue listed for the coming 12 months with milk price being the most significant issue for the coming five years.

In 2024/25 costs were expected to increase across purchased feed, irrigation, repairs and maintenance and labour.

Expectations for business profit 2024/25

The participant survey considers different aspects of farming, from climate outlook to expectations about market conditions for dairy products. Expectations for business profit in the coming year showed 57 per cent of farms are expecting returns to decline whilst a further 29 per cent are expecting returns to remain stable (Figure 8).

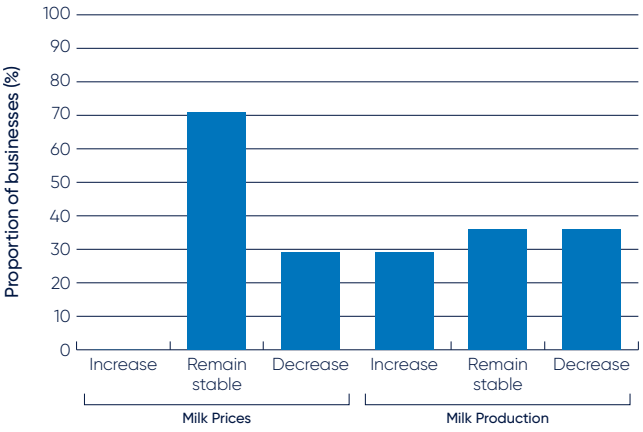
Figure 8 Expected change to farm business profit in 2024/25



Price and production expectations – milk

Participants were largely expecting milk prices to remain stable with 36 percent expecting to sustain current milk production and a further 36 per cent expecting to decrease current milk production levels. This is mainly due to the timing of milk price announcements (1 June), with farmers having more informed choices on their milk factory at the time of the DFMP survey (August–October 2024). Twenty-nine per cent predicted milk price would decrease in 2024/25 (Figure 9).

Figure 9 Producer expectations of milk prices and production in 2024/25



Production expectations – fodder

Fodder production in 2024/25 was expected to increase for 43 per cent of participant farms with 36 per cent expecting a decrease in fodder after continued dry seasonal conditions in 2023/24 (Figure 10).

Cost expectations

The cost categories that were expected to be the most likely to increase in 2024/25 were purchased feed, irrigation, repairs and maintenance and labour with these expected to increase by 71 per cent of participant farms (Figure 11). Fertiliser and fuel and oil were largely expected to stay stable compared to the previous year.

Comments from participants

Respondents indicated that building fodder reserves after exhausting them in 2023/24 will be a major focus, particularly on the back of lower milk prices.

Participant farms raised concerns about increasing government policies and red tape and the ongoing issue of surplus calves and how best to manage them within a business.

A number of participants remarked on the benefits of participating in DFMP and their ability to use the data to improve their business performance, particularly at the participant focused analysis day.

Figure 10 Producer expectations of fodder production in 2024/25

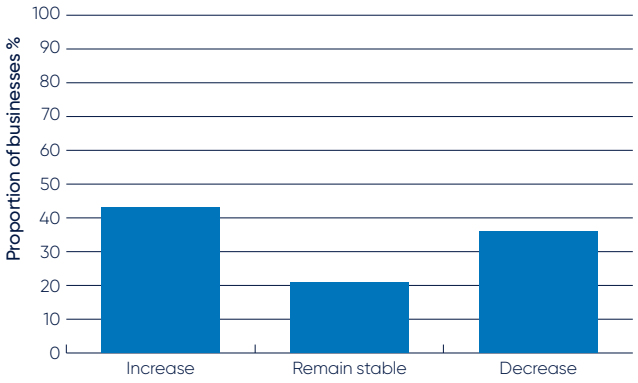
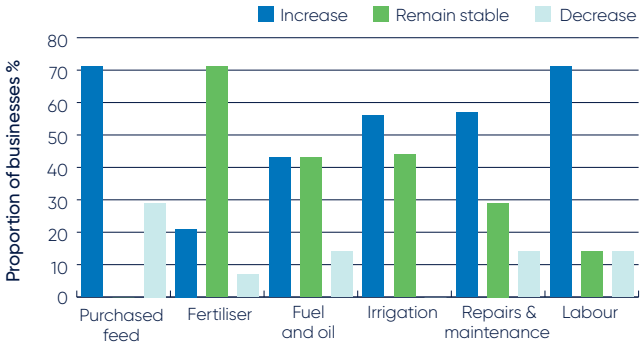


Figure 11 Producer expectations of costs for the dairy industry in 2023/24



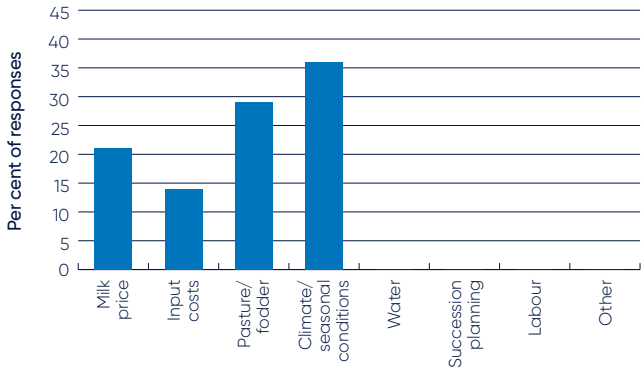
Issues of importance to dairy businesses

Participants were asked to rank issues based on the level of importance to their business – with a ranking of (1) being most important and (8) being least important. The results are shown in Figure 12 for the short-term issues and Figure 13 for medium term issues.

Short term issues – Next 12 months

The most important issue in the coming 12 months was predicted to be climate and seasonal conditions with 36 per cent of respondents ranking this as number one which was not surprising given the below average rainfall received for the 2023/24 year. Pasture and fodder, ranked number two by 29 per cent of respondents, was then ahead of milk price, followed by input costs as being a major issue.

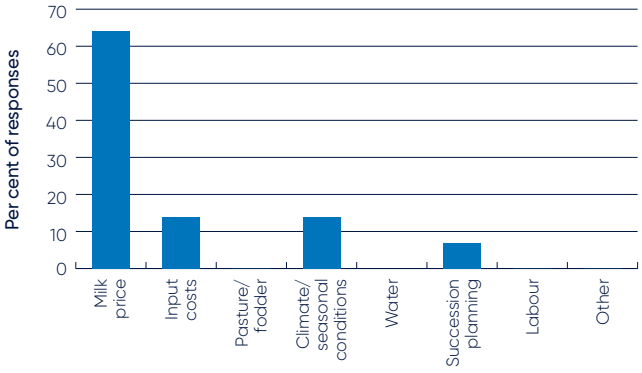
Figure 12 Major issues for individual businesses – 12-month outlook



Medium to long term issues – Next five years

Milk price remains the major consideration for participants farms with 64 per cent of respondents ranking it number one followed by input costs and climate and seasonal conditions at 14 per cent each. Succession planning was the only other issue that ranked as being the number one priority for the coming five years.

Figure 13 Major issues for individual businesses – 5-year outlook



2023/24 Greenhouse gas emissions

The average carbon footprint for South Australian farm monitor farms was 5,046 tonnes of carbon dioxide equivalents (t CO2-e) per farm in 2023/24.

Emissions intensity increased from 0.88 in 2022/23 to 0.91 t CO2-e/t FPCM.

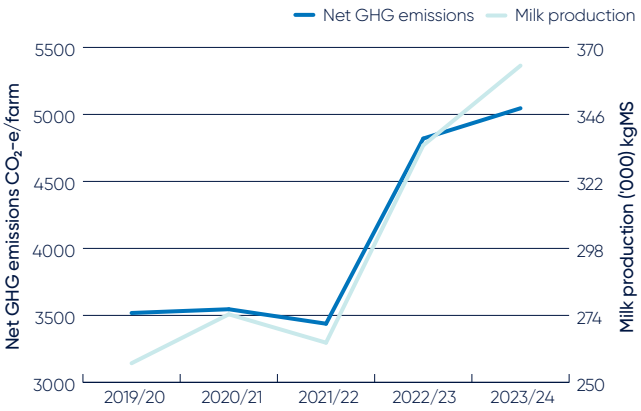
Total emissions

Average net greenhouse gas (GHG) emissions in 2023/24 were the highest in five years at 5,046 tonnes of carbon dioxide equivalent (Table 1 and Figure 14). Over the last 3 years, higher total GHG emissions were associated with increased herd sizes and milk production per farm.

All sources of GHG emissions increased in 2023/24 compared to the previous year. Methane from enteric (ruminant) sources was the largest contributor, making up around 68 per cent of total farm emissions across all participant farms. Pre-farm emissions increased (fertiliser manufacture, production of purchased fodder, grain and concentrates) and carbon dioxide emissions from fossil fuel consumption on farm (electricity, petrochemicals and/or fuel from contractors) also increased.

An increased focus on improving the data collection process for estimating GHG emissions is likely to have contributed to the higher emissions, particularly over the past two years. Farmers now define their own inputs, rather than relying on default values, for manure management and are increasingly encouraged to more accurately estimate the fuel used by contractors whilst on farm.

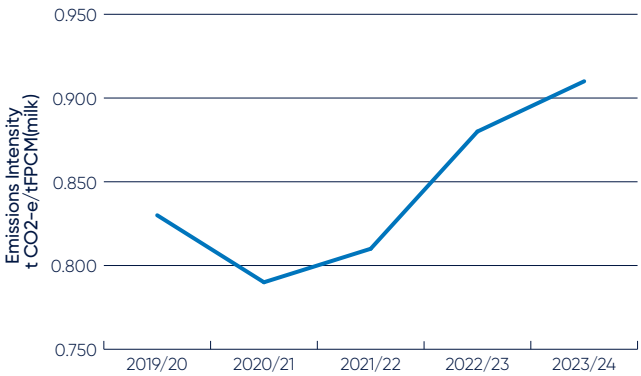
Figure 14 Estimated average net farm GHG emissions and milk solid production between 2019/20 and 2023/24 (CO_2 equivalent)



Emissions intensity

The emissions intensity allocated to milk production (once meat production is considered), increased from 0.88 to 0.91 t CO2-e/t FPCM and has fluctuated over the years (Figure 15 and Table 1). The higher total milk production did not quite keep pace with the higher total emissions in 2023/24 resulting in an increase in emissions intensity. Emissions intensity is calculated by dividing total emissions by the amount of fat and protein corrected milk (FPCM); standard of 4.0 per cent fat and 3.3 per cent protein. Regional and farm variation was also observed over this period.

Figure 15 Estimated average emissions intensity between 2019/20 and 2023/24 (CO_2 equivalent)



The data

This year, several changes to the national inventory have been accounted for in the greenhouse analysis. In addition, a more accurate allocation of purchased feed emissions to milk versus meat has been made based on where the supplement is fed (i.e. milking area vs support area). It is important to note that the calculations with this year's data also re-estimates the historical data with the updated methodology.

Since 2020/21 there was a change in data capture including carbon sequestration in trees and in 2022/23 user defined inputs for manure management were captured rather than utilising state defaults, accounting for some of the variation in total farm emissions. An enhanced effort on improving the data collection process for estimating GHG emissions is likely to have also contributed to the higher emissions.

NOTE: Greenhouse gas emission estimates are calculated using the Australian Dairy Carbon Calculator embedded within DairyBase.

Table 1 Estimated average GHG emissions and intensity between 2019/20 and 2023/24 (CO_2 equivalent)

Emission source	Units	2019/20	2020/21	2021/22	2022/23	2023/24
Sample size		18	16	14	15	14
Methane	t CO_2-e/farm	2,372	2,426	2,399	3,297	3,479
Pre-farm	t CO_2-e/farm	456	439	388	586	640
Nitrous oxide	t CO_2-e/farm	442	420	395	582	562
Carbon dioxide	t CO_2-e/farm	248	261	256	367	390
Tree carbon	t CO_2-e/farm	0	0	-0	-10	-26
Net GHG emissions	t CO_2-e/farm	3,518	3,546	3,438	4,820	5,046
Emissions intensity	t CO_2-e/FPCM (milk)	0.83	0.79	0.81	0.88	0.91
Emissions intensity	t CO_2-e/t MS (milk)	11.6	11.0	11.3	12.3	12.7
Emissions intensity	t CO_2-e/kg lwt (meat)	4.2	4.0	4.4	4.9	4.9

How does 2023/24 compare?

Profits per farm averaged $856,982 across the state, well above the long-term DFMP average of $469,773. The average profit of $2.09/kgMS was the fourth highest in 12 years (accounting for inflation).

Gross farm income decreased by eight per cent to $10.59/kgMS, the second highest in the 12-year history of DFMP (accounting for inflation), driven by a decline in livestock trading in 2023/24.

Increased purchased feed costs, on the back of the poor seasonal conditions, contributed to the highest variable costs seen across the history of the project.

The decrease in EBIT resulted in a decrease in return on total assets to 5.2 per cent.

Farm profit (EBIT) in 2023/24 was the second highest (accounting for inflation) since the start of the DFMP in 2012/13 (Figure 16). Average EBIT was $856,982 in 2023/24, compared to the long-term average of $469,773. Net farm income was $670,610 in 2023/24, compared to the long-term average of $330,194.

Average ROTA was 5.2 per cent in 2023/24, decreasing from 6.9 per cent the previous year (Figure 17), which is the fifth highest in the last 12 years. The average ROE decreased to 5.4 per cent in 2023/24 from 11.2 per cent in 2022/23. This is compared to the long-term average of 4.6 per cent.

Figure 16 Farm profitability between 2012/13 and 2023/24

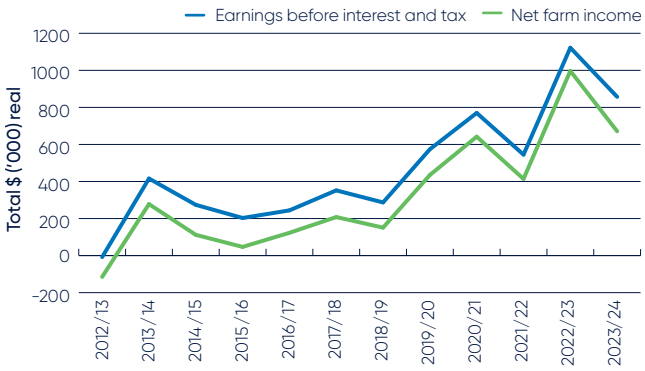
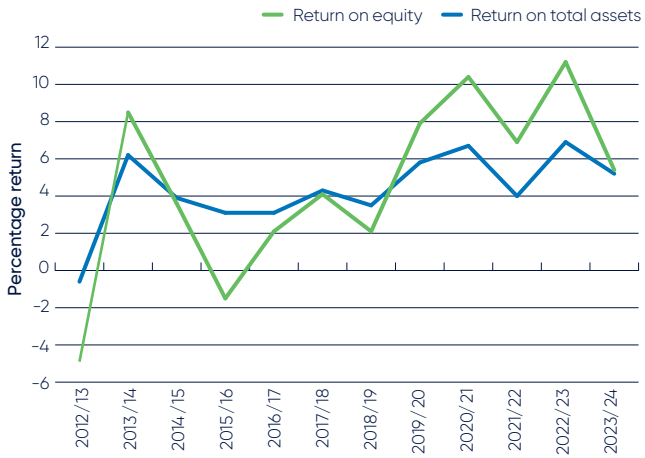


Figure 17 Whole farm performance between 2012/13 and 2023/24



Appendices

Table A6 Capital structure

Farm assets					Other farm assets (per usable hectare)				
	Land value	Land value	Permanent water value	Permanent water value	Plant and equipment	Livestock	Hay and grain	Other assets	Total assets
	$/ha	$/cow	$/ha	$/cow	$/ha	$/ha	$/ha	$/ha	$/ha
Average	20,488	19,733	1,851	1,394	1,453	3,574	277	165	27,809

Liabilities			Equity	
Liabilities per usable hectare	Liabilities per milking cow	Liabilities per kgMS	Equity per usable hectare	Average equity
$/ha	$/cow	$/kgMS	$/ha	%
4,136	3,896	6.63	23,673	83

Calculation of average values of land, water asset and equity excludes zero values

Table A7 Historical data – average farm income, costs and profit per kilogram of milk solids

Income					Variable costs							
	Milk income (net)		Gross farm income		Herd costs		Shed costs		Feed costs		Total variable costs	
Year	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)
2012/13	5.83	7.67	6.40	8.42	0.32	0.42	0.28	0.37	2.96	3.90	3.56	4.68
2013/14	6.83	8.77	7.74	9.94	0.30	0.39	0.26	0.33	3.04	3.90	3.61	4.63
2014/15	6.35	7.97	7.03	8.82	0.29	0.36	0.22	0.28	3.28	4.12	3.79	4.76
2015/16	6.15	7.62	7.10	8.80	0.34	0.42	0.24	0.30	3.13	3.88	3.71	4.60
2016/17	5.78	7.03	6.75	8.21	0.40	0.49	0.27	0.33	2.49	3.03	3.16	3.84
2017/18	6.24	7.44	7.08	8.45	0.31	0.37	0.29	0.35	2.80	3.34	3.40	4.06
2018/19	6.46	7.61	7.32	8.62	0.29	0.34	0.24	0.28	3.30	3.89	3.83	4.51
2019/20	7.62	8.86	8.64	10.05	0.36	0.42	0.26	0.30	3.53	4.10	4.14	4.82
2020/21	7.61	8.72	8.75	10.02	0.37	0.42	0.23	0.26	3.16	3.62	3.76	4.31
2021/22	7.59	8.33	8.92	9.79	0.36	0.39	0.24	0.26	3.67	4.03	4.28	4.70
2022/23	9.89	10.30	11.08	11.53	0.43	0.45	0.30	0.31	4.15	4.32	4.88	5.08
2023/24	9.86	9.86	10.59	10.59	0.40	0.40	0.32	0.32	4.59	4.59	5.31	5.31
Average		**8.35**		**9.44**		**0.41**		**0.31**		**3.89**		**4.61**

Note: 'Real' dollar values are the nominal values converted to 2023/24 dollar equivalents by the consumer price index (CPI) to allow for inflation.
From 2016/17 gross farm income does not include feed inventory changes and changes to the value of carry-over water. These are included in feed costs.

Table A7 Historical data – average farm income, costs and profit per kilogram of milk solids (continued)

	Overhead costs						Profit							
	Cash overhead costs		Non-cash overhead costs		Total overhead costs		Earnings before interest and tax		Interest and lease charges		Net farm income			
Year	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Return on total assets %	Return on equity %
2012/13	1.55	2.04	1.60	2.11	3.15	4.15	(0.31)	(0.41)	0.53	0.70	(0.84)	(1.11)	-0.6	-4.9
2013/14	1.54	1.98	1.31	1.68	2.85	3.66	1.27	1.63	0.52	0.67	0.75	0.96	6.2	8.5
2014/15	1.50	1.88	1.03	1.29	2.52	3.16	0.72	0.90	0.55	0.69	0.16	0.20	3.9	3.6
2015/16	1.60	1.98	1.00	1.24	2.60	3.22	0.79	0.98	0.57	0.71	0.22	0.27	3.1	-1.5
2016/17	1.68	2.04	1.04	1.26	2.71	3.29	0.88	1.07	0.47	0.57	0.40	0.49	3.1	2.1
2017/18	1.61	1.92	0.89	1.06	2.50	2.98	1.18	1.41	0.54	0.64	0.65	0.78	4.3	4.1
2018/19	1.50	1.77	0.90	1.06	2.40	2.83	1.09	1.28	0.49	0.58	0.60	0.71	3.5	2.1
2019/20	1.70	1.98	0.95	1.11	2.66	3.09	1.84	2.14	0.46	0.53	1.39	1.61	5.8	7.9
2020/21	1.62	1.86	1.00	1.15	2.62	3.00	2.37	2.71	0.41	0.47	1.96	2.25	6.7	10.4
2021/22	1.88	2.06	1.27	1.39	3.15	3.46	1.49	1.63	0.42	0.46	1.07	1.17	4.0	6.9
2022/23	2.18	2.27	1.08	1.12	3.26	3.39	2.94	3.06	0.43	0.45	2.51	2.61	6.9	11.2
2023/24	1.99	1.99	1.19	1.19	3.18	3.18	2.09	2.09	0.59	0.59	1.51	1.51	5.2	5.4
Average		**1.98**		**1.31**		**3.28**		**1.54**		**0.59**		**0.95**	**4.3**	**4.6**

Note: 'Real' dollar values are the nominal values converted to 2023/24 dollar equivalents by the consumer price index (CPI) to allow for inflation.

Table A8 Historical data – average farm physical information

	Total usable area	Milking area	Total water use efficiency	Number of milking cows	Milking cows per usable area	Milk sold	Milk sold	Estimated grazed pasture*	Estimated conserved feed*	Home grown feed as % of ME consumed	Concentrate price	
Year	ha	ha	t DM/ 100mm/ ha	hd	hd/ ha	kgMS/ cow	kgMS/ ha	t DM/ ha	t DM/ ha	of ME	Nominal ($/t DM)	Real ($/t DM)
2012/13	340	141	0.70	320	1.2	527	622	4.8	1.2	56	304	400
2013/14	526	164	0.60	453	1.4	469	660	7.9	0.9	57	343	440
2014/15	529	159	0.70	362	1.3	581	738	-11.5	4.1	52	364	457
2015/16	447	131	0.70	355	1.4	586	751	6.4	1.4	52	366	453
2016/17	565	200	0.60	394	1.3	539	630	5.7	1.9	65	304	370
2017/18	527	205	0.60	399	1.1	569	628	4.4	1.3	55	340	406
2018/19	573	226	0.63	414	1.1	574	600	5.3	0.9	61	485	571
2019/20	592	238	0.61	446	1.0	577	579	4.8	1.1	59	505	588
2020/21	562	256	0.6	449	0.9	618	559	5.0	1.4	57	412	472
2021/22	515	225	0.6	460	0.9	580	507	4.9	1.2	60	455	499
2022/23	510	293	0.5	613	1.2	553	641	5.5	1.5	61	555	578
2023/24	533	301	0.7	648	1.2	575	663	5.3	1.2	55	538	476
Average	**518**	**212**	**0.6**	**443**	**1.2**	**562**	**632**	**4.0**	**1.5**	**58**		**476**

*From 2006/07 to 2010/11 estimated grazed pasture and conserved feed was calculated per usable hectare.
From 2011/12 estimated grazed pasture and conserved feed was calculated per hectare of milking area.

Appendix B: Glossary of terms, abbreviations and standard values

Glossary of terms

All other farm income	Income to the farm from all sources except milk. Includes livestock trading profit, dividends, interest payments received, and rent from farm houses.
Allocation	Water that is actually available to use or trade in any given year, including new allocations and carryover. Previously known as temporary water. Full allocation means irrigators receive 100 per cent of their HRWS.
Allocation trade	The transfer of a volume of allocation water between a seller and buyer. Water is traded within a current irrigation season. Previously this was known as trading of temporary water entitlement and some irrigators still use this term.
Appreciation	An increase in the value of an asset in the market, often only applicable to land value.
Asset	Anything managed by the farm, whether it is owned or not. Assets include owned land and buildings, leased land, plant and machinery, fixtures and fittings, trading stock, farm investments (i.e., Farm Management Deposits), debtors, and cash.
Cash overheads	All fixed costs that have a cash cost to the business. Includes all overhead costs except imputed labour costs and depreciation.
Cost structure	Variable costs as a percentage of total costs, where total costs equal variable costs plus overhead costs.
Concentrates	Refers to feeds with a concentrated source of energy such as grains, pellets and other grain mixes.
Debt servicing ratio	Interest and lease costs as a percentage of gross farm income.
Depreciation	Decrease in value over time of capital asset, usually as a result of using the asset. Depreciation is a non-cash cost of the business but reduces the book value of the asset and is therefore a cost.
Earnings before interest and tax (EBIT)	Gross income minus total variable and total overhead costs.
Employed labour cost	Cash cost of any paid employee, including on-costs such as superannuation and Workcover.
Equity	Total assets minus total liabilities. Equal to the total value of capital invested in the farm business by the owner/ operator(s).
Equity per cent	Total equity as a percentage of the total assets owned. The proportion of the total assets owned by the business.
Feed costs	Cost of fertiliser, irrigation (including effluent), hay and silage making, fuel and oil, pasture improvement, fodder purchases, grain/ concentrates, agistment and lease costs associated with any of the above costs, and feed inventory change.
Feed inventory change	An estimate of the feed on hand at the start and end of the financial year to capture feed used in the production of milk and livestock.
Finance costs	See interest and lease costs.
Full time equivalent (FTE)	Standardised labour unit. Equal to 2,400 hours a year. Calculated as 48 hours a week for 50 weeks a year.
Grazed pasture	Calculated using the back-calculation approach. Grazed pasture is calculated as the difference between total metabolisable energy required by livestock over the year and amount of metabolisable energy available from other sources (hay, silage, grain, and concentrates). Total metabolisable energy required by livestock is a factor of age, weight, growth rate, pregnancy, and lactation requirements, walking distance to shed, terrain and number of animals. Total metabolisable energy available is the sum of metabolisable energy from all feed sources except pasture, calculated as (weight (kg) x dry matter content (DM per cent) x metabolisable energy (MJ/ kg DM)).
Gross farm income	Farm income including milk sales, livestock trading and other income such as income from grants and rebates.
Gross margin	Gross farm income minus total variable costs.
Herd costs	Cost of artificial insemination (AI) and herd tests, animal health and calf rearing.
Imputed	An estimated amount introduced into economic management analysis to allow reasonable comparisons between years and between other businesses.
Imputed labour cost	An allocated allowance for the cost of owner/operator, family, and sharefarmer time in the business.
Interest and lease costs	Total interest plus total lease costs paid.
Labour cost	Cost of the labour resource on farm. Includes both imputed and employed labour costs.
Labour efficiency	FTEs per cow and per kgMS. Measures productivity of the total labour resources in the business.
Liability	Money owed to someone else, e.g., family or a financial institute such as a bank.
Livestock trading profit	An estimate of the annual contribution to gross farm income by accounting for the changes in the number and value of livestock during the year. It is calculated as the trading income from sales minus purchases, plus changes in the value and number of livestock on hand at the start and end of the year, and accounting for births and deaths.
Milk income	Income from the sale of milk. This is net of compulsory levies and charges.
Milking area	The area of land grazed by milking cows to produce milk.
Net farm income	Earnings before interest and tax (EBIT) minus interest and lease costs. The amount of profit available for capital investment, loan principal repayments and tax.

Nominal terms	Dollar values or interest rates that include an inflation component.
Number of milkers	Total number of cows milked for at least three months.
Other income	Income to the farm from other farm owned assets and farm business related external sources. Includes milk factory dividends, interest payments received, and rent from farm cottages.
Overhead costs	All fixed costs incurred by the farm business that do not vary with the level of production. These include cash overhead costs such as employed labour and noncash costs such as imputed owner-operator labour, family labour and depreciation of plant and equipment. It excludes interest, lease costs, capital expenditure, principal repayments, drawings, and tax.
Real terms	Dollar values or interest rates that have no inflation component.
Return on equity (ROE)	Net farm income divided by the value of total equity.
Return on total assets (ROTA)	Earnings before interest and tax divided by the value of total assets under management, including owned and leased land.
Shed costs	Cost of shed power and dairy supplies such as filter socks, rubberware, vacuum pump oil etc.
Top 25%	Regional or State average for the Top 25% of participant farms ranked by return on total assets; can also be referred to as the top group, top performers within a region or the state.
Total income	See gross farm income.
Total usable area	Total hectares managed minus the area of land which is of little or no value for livestock production e.g., house and shed area.
Total water use efficiency	Homegrown feed consumed or harvested per 100mm water 'applied' (rainfall and irrigation) to the usable hectares on the farm.
Variable costs	All costs that vary with the size of production in the enterprise e.g., herd, shed and feed costs (including feed and water inventory change).
Water inventory change	An estimate of the values irrigation water on hand at the start and end of the financial year to capture water used in the production of pasture and crops.

Feeding Systems	
Low bail	Low bail is defined by the one-tonne annual cap of grain or concentrates fed in the dairy bail – i.e. cows are fed up to one tonne of grain and concentrate in the dairy at milking time throughout lactation and livestock graze pasture all year round.
Moderate – High bail	The level of grain or concentrate fed in the bail is more significant than one tonne per annum, and livestock graze pasture all year round.
Partial mixed ration	In the partial mixed ration (PMR) system, livestock animals graze on pasture for most of the year, if not all of the year, while being fed a PMR on a feed pad.
Hybrid system	Hybrid systems are classified as grazing pasture for fewer than nine months of the year while feeding a partial mixed ration on a feed pad with grain or concentrates.
Total mixed ration	A total mixed ration or TMR is classified by zero-grazing, where cows are contained and fed a TMR throughout the year.

List of abbreviations

AI	Artificial insemination
CH_4	Methane
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
CoP	Cost of production
DFMP	Dairy Farm Monitor Project
DM	Dry matter of feed stuffs
EBIT	Earnings before interest and tax
FPCM	Fat and protein corrected milk
FTE	Full time equivalent
ha	Hectare(s)
hd	Head
HRWS	High Reliability Water Shares
kg	Kilograms
LRWS	Low Reliability Water Shares.
ME	Metabolisable energy (MJ/kg DM)
MJ	Megajoules of energy
ML	Megalitres
mm	Millimetres. 1mm is equivalent to four points or 1/25th of an inch of rainfall
MS	Milk solids (protein and fat)
N_2O	Nitrous oxide
Q1	First quartile, i.e., the value of which one quarter, or 25 per cent, of data in that range is less than the average
Q3	Third quartile, i.e., the value of which one quarter, or 25 per cent, of data in that range is greater than the average
ROTA	Return on total assets
ROE	Return on equity
t	Tonne = 1,000kg

Standard values

Pasture consumption

The pasture consumption calculation assumes 11 ME for homegrown feed.

Livestock values

The standard vales used to estimate the inventory values of livestock were determined by breed and liveweight. Example values for Friesians were:

Category	Opening value ($/hd)	Closing value ($/hd)
Mature cows (550kg)	$2,200	$2,200
2-year-old heifers	$1,650	$2,200
1-year old heifers	$825	$1,650
23/24 calves		$825
Mature bulls	$3,300	$3,300

Imputed owner/operator and family labour

In 2023/24, the imputed owner/operator and family labour rate was $36/hr based on a full time equivalent (FTE) working 48 hours/week for 50 weeks of the year.

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